CLAIMS

What is claimed is:

1. A method of operating a robot cleaner with a processor comprising:

selecting a cleaning mode, the cleaning modes include a room cleaning mode and a localized cleaning mode, the localized cleaning mode includes doing a serpentine clean within a predetermined pattern; and

cleaning with the robot cleaner in the selected mode.

2. The method of claim 1, wherein the predetermined pattern is rectangular.

3. The method of claim 2, wherein the predetermined pattern is square.

4. The method of claim 1, wherein the room cleaning mode is a serpentine clean over the entire room.

5. The method of claim 1, wherein room cleaning mode includes object following.

6. The method of claim 1, wherein the robot cleaner is a robotic vacuum cleaner.

7. The method of claim 1, wherein a button on the robot cleaner is used for selecting the localized cleaning mode.

8. The method of claim 1, wherein a remote device is used to select the localized cleaning mode.

9. The method of claim 1, wherein a dirt sensor on the robot cleaner is used for determining to switch to a localized cleaning mode.

10. A robot cleaner comprising:

a cleaning unit on the robot cleaner;

a processor to control the robot cleaner in a selected cleaning mode, the cleaning modes

include a room cleaning mode and a localized cleaning mode, the localized cleaning mode includes doing a serpentine clean within a predetermined pattern.

11. The robot cleaner of claim 10, wherein the predetermined pattern is rectangular.

12. The robot cleaner of claim 11, wherein the predetermined pattern is square.

13. The robot cleaner of claim 10, wherein the room cleaning mode is a serpentine clean over the entire room.

14. The robot cleaner of claim 10, wherein room cleaning mode includes object following.

15C. The robot cleaner of claim 10C, wherein the robot cleaner is a robotic vacuum cleaner.

16. The robot cleaner of claim 10, wherein a button on the robot cleaner is used for selecting the localized cleaning mode.

17. The robot cleaner of claim 10, wherein a remote device is used to select the localized cleaning mode.

18. The robot cleaner of claim 10, wherein a dirt sensor on the robot cleaner is used for determining to switch to a localized cleaning mode.

19. A method of using a robot cleaner to clean a room, comprising:
cleaning a room in a serpentine pattern;
detecting an obstacle in the room;
going into an object following mode to avoid the obstacle; and
resuming the serpentine pattern clean.

20. The method of claim 19, wherein serpentine pattern goes from wall to wall.

21. The method of claim 19, wherein the object is a piece of furniture.

22. The method of claim 19, wherein the object is a wall.

23. The method of claim 19, wherein the object following mode keeps the robot cleaner a fixed distance from the object.

24. The method of claim 19, wherein the object is in the middle of the room.

25. The method of claim 24, wherein the robot cleaner follows the object until the robot cleaner can continue a path segment of the serpentine clean on the other side of the object.

26. The method of claim 19, wherein the serpentine clean is such that the cleaning for one path segment overlaps with the cleaning for the next path segment.

27. The method of claim 19, wherein the robot cleaner keeps track of what portions of the room has been cleaned.

28. A robot cleaner comprising:

a cleaning unit on the robot cleaner;

a motion unit to move the robot cleaner;

sensor unit to detect obstacles;

a processor to control the robot cleaner to clean the room in a serpentine pattern; the processor causing the robot cleaner to go into an object following mode to avoid an obstacle detected by the sensor unit, the processor causing the robot cleaner to resume the serpentine pattern clean once the obstacle is avoided.

29. The robot cleaner of claim 28, wherein serpentine pattern goes from wall to wall.

30.. The robot cleaner of claim 28, wherein the object is a piece of furniture.

31. The robot cleaner of claim 28, wherein the object is a wall.

32. The robot cleaner of claim 28, wherein the object following mode keeps the robot cleaner a fixed distance from the object.

33. The robot cleaner of claim 28, wherein the object is in the middle of the room.

34. The robot cleaner of claim 33, wherein the robot cleaner follows the object until the robot cleaner can continue a path segment of the serpentine clean on the other side of the object.

35. The robot cleaner of claim 28, wherein the serpentine clean is such that the cleaning for one path segment overlaps with the cleaning for the next path segment.

36. The robot cleaner of claim 28, wherein the robot cleaner keeps track of what portions of the room has been cleaned.

37. A method of using a robot cleaner to clean a room, comprising:

cleaning a room in a serpentine pattern;

detecting an a descending stairway with an edge sensor, the edge sensor unit including an emitter and a detector, the detector detecting less reflected energy when the sensor is positioned over the descending stairway ;

avoiding the descending stairway; and

resuming the serpentine pattern clean.

38. The method of claim 37, wherein serpentine pattern goes from wall to wall.

39. The method of claim 37, wherein the detector receives substantially no reflected energy when the sensor is positioned over the descending stairway.

40. The method of claim 37, wherein the edge sensor is a convergent mode sensor.

41. The method of claim 40, wherein the convergent mode sensor is focused on the floor.

42. The method of claim 37, wherein the edge sensor is positioned at the periphery of the robot cleaner.

43. The method of claim 37, wherein the serpentine clean is such that the cleaning for one path segment overlaps with the cleaning for the next path segment.

44. The method of claim 37, wherein the robot cleaner keeps track of what portions of the room has been cleaned.

45. The method of claim 37, wherein the emitter emits infrared radiation.

46. A robot cleaner comprising:

a cleaning unit on the robot cleaner;

a motion unit to move the robot cleaner;

sensor unit to detect descending stairways, the sensor unit including an emitter and a detector, the detector detecting less reflected energy when the detector is positioned over a descending stairway;

a processor to control the robot cleaner to clean the room in a serpentine pattern; the processor causing the robot cleaner to avoid a detected descending stairway, the processor causing the robot cleaner to resume the serpentine pattern clean once the descending stairway is avoided.

47. The robot cleaner of claim 46, wherein serpentine pattern goes from wall to wall.

48. The robot cleaner of claim 46, wherein the detector receives substantially no reflected energy when the sensor is positioned over the descending stairway.

49. The robot cleaner of claim 46, wherein the edge sensor is a convergent mode sensor.

50. The robot cleaner of claim 49, wherein the convergent mode sensor is focused on the floor.

51. The robot cleaner of claim 46, wherein the edge sensor is positioned at the periphery of the robot cleaner.

52. The robot cleaner of claim 46, wherein the serpentine clean is such that the cleaning for one path segment overlaps with the cleaning for the next path segment.

53. The robot cleaner of claim 46, wherein the robot cleaner keeps track of what portions of the room has been cleaned.

54. The robot cleaner of claim 46, wherein the emitter emits infrared radiation.

55. A robot comprising:

an element normally in a first position, the element being movable to a second position by contact with an object;

an emitter that transmits electromagnetic energy;

a detector that detects electromagnetic energy , wherein when the element is in the first position the detector detects electromagnetic energy from the emitter, and when the element is in the second position the detector detects less electromagnetic energy from the detector such that the contact condition can be determined; and

a processor operably connected to the detector to modify the operation of the robot when the contact condition is determined.

56. The robot of claim 55, wherein the element is a bumper.

57. The robot of claim 55, wherein in the second position the element blocks the energy from the emitter.

58. The robot of claim 55, wherein in the first position the element does not block the energy from the emitter

59. The robot of claim 55, wherein the element is biased in the first position by a spring.

60. A method of operating a robot comprising:

radiating electromagnetic energy from an emitter;

detecting electromagnetic energy with a detector, wherein an element is normally in a first position, the element being movable to a second position by contact with an object, wherein when the element is in the first position the detector detects electromagnetic energy from the emitter, and when the element is in the second position the detector detects less electromagnetic energy from the detector such that the contact condition can be determined; and modifying the operation of the robot in response to the contact condition.

61. The method of claim 60, wherein the element is a bumper.

62. The method of claim 60, wherein in the second position the element blocks the energy from the emitter.

63. The method of claim 60, wherein in the first position the element does not block the energy from the emitter

64. The method of claim 60, wherein the element is biased in the first position by a spring.

65. A tactile sensor for a robot comprising:

an element normally in a first position, the element being movable to a second position by contact with an object;

an emitter that transmits electromagnetic energy; and

a detector that detects electromagnetic energy , wherein when the element is in the first position the detector detects electromagnetic energy from the emitter, and when the element is in the second position the detector detects less electromagnetic energy from the detector such that the contact condition can be determined.

66. The tactile sensor of claim 65, wherein the element is a bumper.

67. The tactile sensor of claim 65, wherein in the second position the element blocks the energy from the emitter.

68. The tactile sensor of claim 65, wherein in the first position the element does not block the energy from the emitter

69. The tactile sensor of claim 65, wherein the element is biased in the first position by a spring.